al. EP 0087281. The Examiner has objected to claims 44 and 45 and indicated the allowability of claim 47. The Applicant thanks the Examiner for this indication of allowable subject matter.

In view of the remarks herein, the undersigned representative hereby requests reconsideration of the Examiner's rejections.

1. **The Cited References Do Not Teach the Use of a Variable Diffraction Efficiency Master Hologram in Optical Contact Printing Methods and Systems, Wherein the Resulting Replica Also Has the Attribute of Variable Diffraction Efficiency as is Proposed by Each of the Claims**

Each of the independent claims 1, 12, 22, 32, 46, and 48 refer to at least one hologram which is to be duplicated. The hologram that is duplicated is referred to for discussion purposes below as the master hologram. Either as amended, or as originally presented, each of the independent claims proposes that the diffraction efficiency of the master hologram be variable as opposed to static. Contrary to the Examiner's assertion, none of the references cited by the Examiner discuss a method or system for duplicating or replicating a master hologram, wherein the master hologram has a variable diffraction efficiency. As stated by the Examiner, the term "variable diffraction efficiency" describes a hologram which can assume varied diffraction efficiencies **after recording**. (Final Office Action ¶ 1)(emphasis added). The independent claims use a variable diffraction efficiency master hologram in optical contact printing methods and systems, wherein the resulting replica also has the attribute of variable diffraction efficiency, hence the use of the word "replica." The ability to replicate variable diffraction efficiency holograms through contact printing has not heretofore been disclosed or accomplished and is not obvious in view of the cited art.

The Examiner argues that Hall et al. (United States Patent No. 5,471,326)("Hall"),

> teaches the use of computer generated holograms for copying processes and Amako et al. '214 teaches means for their generation as well as the advantages that a number of different holograms can be replayed without moving the master or the need to generate a (sic) optically produced master. These are clear advantages to the use of computer generated holograms in LC materials as the masters.

(Final Office Action, pgs. 3-4). More particularly, the Examiner directs the undersigned representative to Column 10, lines 48-50 of ("Hall") for the proposition that optically or computer generated holograms are used for contact copying. (Final Office Action, pg. 3). Initially, the undersigned representative points out that Hall is directed to beam steering through the use of beam diffraction using a holographic optical element (HOE). Hall is not directed to the formation or replication of holograms. Further, the holograms comprising the HOE are static holograms. Consequently, the discussion in Hall regarding hologram formation is with respect to the formation of static holograms. Referring to Hall, Column 10, lines 47-50 states, "[a] master hologram for each hologram employed can be either a computer generated hologram or an optically generated hologram. **Any additional holograms can be copied by contact printing**." (emphasis added). This language does not support the proposition that a master computer generated hologram (CGH) may be used in contact printing. This language suggests that the hologram made from the master CGH may itself become the master hologram so as to be copied by contact printing. The CGH is not the master hologram used in the contact printing process. Further, the holograms generated from the CGH are not replicas of the CGH. The holograms generated from the CGH do not have the attribute of variable diffraction efficiency. Consequently, Hall does not teach the use of a master hologram having a variable diffraction efficiency in a contact copying process. Further, Hall does not disclose or suggest the replication

of a master hologram having a variable diffraction efficiency, wherein the replica also exhibits variable diffraction efficiency.

The Examiner points to United States Patent No. 5,682,214 ("Amako") to show the generation of computer generated holograms using liquid crystal devices. Amako describes the use of an electrically controllable liquid crystal CGH in order to control input beams that are used in image formation. There is no discussion in Amako of hologram replication by contact copying or of any type of hologram replication for that matter. The claims of the pending application propose the replication of a variable diffraction efficiency master hologram using contact printing. While the CGH described in Amako may exhibit variable diffraction efficiency under computer control, Amako does not disclose or suggest the replication of this CGH by contact printing or by any other method or means. Amako does not disclose or suggest the limitations of the pending claims.

While the prior art teaches using a single master CGH to generate multiple holograms, each having a different focal length, the prior art does not teach the use of a single master CGH in a contact printing process to replicate the CGH. Further, in processes where the CGH is used as the master hologram, the resulting holograms made during this process are not replicas of the variable diffraction efficiency CGH as the resulting holograms do not exhibit the variable diffraction efficiency characteristics of the CGH.

2. Assuming that the Cited References Do Suggest the Discrete Limitations of the Claims, There is No Reasonable Expectation that the Combination of These Limitations Would Result in the Claimed Subject Matter

Assuming, *arguendo*, that each of Hall and Amako stood for the propositions set forth by the Examiner above, as evidence by the attached declaration of inventor Richard Sutherland,

there is no reasonable expectation that the combination of these propositions would successfully result in the claimed subject matter. *See In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). Since at least some degree of predictability is required in order to sustain an obviousness rejection and the evidence shows no reasonable expectation of success, the Examiner has not established a *prima facie* case of unpatentability. *See* MPEP § 2143.02. More particularly, the computer generated hologram in a liquid crystal device described in Amako cannot be used as a master hologram with variable diffraction efficiency in a contact printing scheme because of a) its pitch size, b) its inherent limitations in electrode technology that prevent it from achieving Bragg regime diffraction, and c) its inability, even in principle, to form a reflection hologram. (See Sutherland Declaration, paragraphs 7-12).

Consequently, the prior art does not meet the limitations of independent claims 1, 12, 22, 32, 46, and 48. The Examiner has not provided any reference that teaches (1) the use of a variable diffraction efficiency master hologram in a contact printing process or (2) the use of a variable diffraction efficiency master hologram in a contact printing process wherein the printed hologram is a replica of the master hologram and exhibits the attribute of variable diffraction efficiency. Further, there is no reasonable expectation that the combination of references would successfully result in the claimed subject matter. Every pending claim proposes at least the limitation set forth in (1) above. Since none of the cited references disclose at least (1), claims 1-48 of the present application are patentable over the cited references as none of the references, either singly or in combination, anticipates or renders unpatentable the claimed subject matter.

CONCLUSION

The undersigned representative respectfully submits that this application is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that the prosecution might be advanced by discussing the application with Applicants' representatives, in person or over the telephone, we welcome the opportunity to do so.

Respectfully submitted,

Date: 3/21/02

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